GH Releasing Peptides - Structure and Kinetics

C.Y. Bowers

Tulane University Medical Center, 1430 Tulane Avenue
New Orleans, LA 70112, USA

SYNOPSIS

A new class of small synthetic peptides has been developed which specifically release GH. They consist of 6-7 amino acids and release GH in animals as well as humans. So far 3 of these peptides have been administered to humans, i.e., GHRP-6, GHRP-1 and GHRP-2. As in rats, these 3 peptides have been found to be increasingly more effective in releasing GH in humans. All 3 GHRPs release GH more efficaciously than GHRH 1-44 NH_2 in humans. Particularly noteworthy is that GHRP-6, GHRP-1 AND GHRP-2 all release GH after oral administration. Near maximal amounts of GH can be released after GHRP-1 and GHRP-2 oral administration. In the present studies, the GH responses and serum irGHRP levels after i.v., s.c. and oral administration have been determined in normal younger men and/or women. By each route of administration GH was very effectively released. Additionally, GH release was induced by oral GHRP-6 in children with various degrees of GH deficiency. Noteworthy is the synergistic release of GH induced by the combined i.v. bolus administration of 1 μg/kg of GHRP-1 + GHRH 1-44NH_2. Thus, these results demonstrate GHRPs' potential importance at the theoretical as well as pharmaceutical level.

INTRODUCTION

A new class of small synthetic peptides, GHRPs (GH releasing peptides), has been developed /1,2/. These peptides, which consist of 6-7 amino acids, specifically release GH in multiple animal species as well as in humans of various ages and both genders. This includes children with various degrees of GH deficiency /3,4/. The GHRPs act on both the pituitary and hypothalamus to release GH via non-GHRH receptors as well as non-GHRH intracellular and endocrine mechanisms /5-20/. So far, three GHRPs (GHRP-6, GHRP-1 and GHRP-2) have been given to humans /21-24/. As observed in rats, these peptides have been found increasingly more effective (2-3 times, respectively) in releasing GH in humans. Except for potency differences, results indicate that the qualitative aspects of the three peptides appear to be the same and thus in principle the results of these peptides can be directly interrelated. In humans, the GHRPs release GH not only after i.v. and s.c. administration but also when administered orally /3,23-25/, intranasally /26,27/, and by continuous i.v. infusion /28-30/. The GHRPs release GH more effectively than GHRH 1-44NH_2 /22-24/. Their actions are independent and complementary to, but also seemingly interactive with, native GHRH in a permissive way /9/.

The GH releasing action of the GHRPs has been so generally effective in various types of animals as well as in humans that the following hypothetical projections are proposed. A GHRP-like natural ligand and system exists which, in addition to native GHRH and SRIF, is involved in the regulation of GH secretion. Furthermore, GHRPs may be valuable in the future for pharmaceutical and agricultural purposes. Chronic administration of the GHRPs to rats increased body weight and to cows increased milk production /2,9,unpublished/.

In these studies, GHRP-6, GHRP-1 and GHRP-2 have been administered i.v., s.c. and/or orally to normal younger men and/or women in order to demonstrate the effects on GH release. Also irGHRP serum levels were determined af-